Bureau of Epidemiology
Utah Department of Health

Invasive Pneumococcal Disease (IPD) 2005

Population:
The surveillance area is Utah; data collection is passive. Utah population is 2005 was 2,528,926. US data is from active surveillance in limited areas.

Case Definition:
Isolation of *Streptococcus pneumoniae* from a normally sterile site in a Utah resident during 2005.

Historical Data:
IPD data has not been collected in prior years. 2005 was the first year of comprehensive reporting data. There were 140 cases reported in 2005.

Rates* by Age Group

Age (years)	Cases Rate UT	Cases Rate US
<1	23.3	37
1	13.8	31.7
2-4	8.8	12.3
5-17	3.3	2.5
18-34	2.3	3.9
35-49	4.1	10.9
50-64	7.1	18.3
>64	14.6	38.4
Total	5.5	12.8

**All rates are per 100,000 population per year.*

Mortality:
There were 14 deaths (8 women, 6 men, comprising 10% of total) reported in 2005 for a rate of 0.6/100,000 versus US average of 1.6/100,000. Rates of mortality are highest in adults over 50.

Age Range	n	% Mortality
<1	12	8.3
1-4	20	5.0
5-17	18	5.0
18-49	36	5.6
50-64	23	17.4
>64	31	16.1

Syndromes:
This table demonstrates the proportion of reported cases by syndrome (in UT and US), as well as the proportion of cases resulting in death (in UT). Bacteremia is classified as "without focus".

Syndrome	% Utah	% US	% Death
Meningitis	8.6	6.1	25.0
Bacteremia	16.4	22.0	4.3
Pneumonia	63.6	67.0	10.1
Other	5.7	4.9	12.5
Unknown	5.7		0

Pneumonia:

This table shows the age group distribution of invasive pneumonia.

Age	Number Cases	% by Age	Number Died	% Died
0-4	17	19.1	2	11.8
5-17	10	11.2	0	0
18-49	24	27.0	2	8.3
50-64	16	18.0	3	18.8
>64	22	24.7	2	9.1

Antibiotic Susceptibility:

Of 138 reported cases, antibiotic susceptibility profiles were performed on 125 isolates. There were 31 isolates that were non-susceptible to one or more antibiotics (25%). Some labs only tested or reported one antibiotic (penicillin) so this data may not be representative of isolates that are susceptible to penicillin and resistant to other antibiotics. Resistance profiles of the non-susceptible isolates are as follows:

Antibiotic	n*	% Susc	% Int	% Res
Penicillin	31	3	32	65
Cefotaxime	25	96	4	0
Ceftriaxone	20	100	0	0
Erythromycin	26	54	4	42
Azithromycin	18	61	0	39
Tetracycline	20	80	5	15
Levofloxacin	22	96	4	0
Gatifloxacin	18	100	0	0
TMP/SXT	25	36	20	44
Vancomycin	26	100	0	0

**n=number of isolates tested*

Susceptibility by Age Group

Age Group	n*	% Non-susceptible*
<2	19	31.6
3-17	25	20.0
18-49	36	22.2
50-64	23	17.4
>64	31	25.8

** Non-susceptible to any tested antibiotic*
**n=number of isolates tested*

Susceptibility by Syndrome

Syndrome	n*	% Non-susceptible*
Meningitis	12	8.3
Bacteremia	23	4.3
Pneumonia	89	27.0
Other	9	33.3
Unknown	7	28.6

** Non-susceptible to any tested antibiotic*
**n=number of isolates tested*

Susceptibility (Pneumonia) by Age or Vaccine History

Pneumonia has a higher rate of non-susceptibility than meningitis and bacteremia. When we look at non-susceptible population by age (independent of disease syndrome), the highest rate is in children under the age of 2. When we look at pneumonia syndrome, by age and susceptibility, we see the highest proportion of non-susceptibles in the <2 year old category.

Age	n	# non susceptible	% non susceptible	# vaccinated	# vaccinated non susceptible	% vaccinated non susceptible
<2	8	5	62.5	3	2	66.7
3-17	19	4	21.1	4	0	0
18-49	24	5	20.8	2	1	50
50-64	16	4	25	3	1	33.3
>64	22	7	31.8	6	3	50

Note:many individuals have unknown vaccine status.

Mortality by Susceptibility

Susceptibility	n*	% of total
Susceptible	94	8.5
Not susceptible	31	3.2
Unknown	13	38.5

**n=number of isolates tested*

Vaccination:

There are two licensed vaccines for IPD:

- Prevnar for children
- Pneumovax for adults at high risk

Serogroups for the vaccines were selected as those most likely to be resistant to antibiotics, therefore individuals who have been vaccinated should be less likely to be infected by a non-susceptible strain.

Vaccine Status by Age Group

Age Group	# Vaccinated (deaths)	# Not Vaccinated (deaths)	# Unknown Vaccine Status (deaths)
<5	13	11 (1)	7 (1)
5-49	3	32	18 (3)
50-64	4 (1)	9	10 (3)
>64	7 (2)	11	13 (3)

Antibiotic Susceptibility by Vaccine Status

Antibiotic	Vaccine+ (%)	Vaccine- (%)	Vaccine Unknown
Susceptible	15 (55)	48 (76)	31 (65)
Non-Susceptible	9 (33)	13 (21)	9 (18)
Unknown	3	2	8

Risk Factors

According to vaccine manufacturers, risk factors for IPD include chronic cardiovascular, pulmonary, liver, or renal disease, diabetes, immune suppression, alcohol abuse, and asthma. Vaccines do not cover all of the circulating serogroups and response to the vaccine varies.

Mortality by Risk Factor

Risk Factor	Number Died (%)	Survived
Present	7 (11%)	56
Absent	5 (10%)	44
Unknown	2 (8%)	24

Syndrome by Risk Factor

Syndrome	Any Risk Factor	No Risk Factor	Unknown Risk Factor
Meningitis	2 (17%)	9	1
Pneumonia	47 (59%)	23	10
Bacteremia	12 (55%)	8	2
Empyema	2 (50%)	4	0

Risk Factor* by Vaccine Status

Vaccine Status	Any Risk Factor	No Risk Factor	Unknown Risk Factor
Yes	13 (48%)	12	2
No	30 (48%)	28	5
Unknown	20 (42%)	9	19

** Risk factor is defined by medical conditions only, not age groups*

Risk Factor* by Age Group

Age Group	Any Risk Factor (%)	No Risk Factor	Unknown Risk Factor
<5	4 (16%)	21	6
5-17	4 (29%)	10	4
18-49	16 (62%)	10	10
50-64	17 (77%)	5	1
>64	23 (88%)	3	5

**Risk factor is defined by medical conditions only, not age groups*
% is any risk factor/any risk factor + no risk factor